

# Analysis of Factors Affecting USD/LKR Exchange Rate

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**Abstract**—This paper intends to investigate the factors affecting the US Dollar exchange rate in Sri Lanka, in the period of January 2009 to June 2015, by using the econometric framework of Johanson and Juselius Cointegration, Vector Auto Regressive model, Granger Causality, and Variance Decomposition analysis. The empirical results of the model indicate that the increase in previous month net foreign assets and trade balance, and a decrease in the previous month exchange rate, has a significant influence on the short run appreciation of exchange rate. Granger Causality test confirms past values of net foreign assets, trade balance, and workers' remittance have a predictive ability in determining the present values of exchange rate while, Variance Decomposition indicate, variation in exchange rate in short term and long term time horizon is due to the exchange rate itself and net foreign assets, trade balance and workers' remittance respectively.

**Keywords;** *USD/LKR exchange rate, VAR model, Cointegration, Net foreign assets, Workers' remittance, Trade balance.*

## I. INTRODUCTION

Most countries use their own currencies as a medium of exchange. They are deemed to be the legal tender or legally valid to make all local payments. Exchange rates exist because countries have to exchange their national currencies with foreign currencies to engage in trade and financial transactions with other countries.

The importance of the exchange rate differs from country to country. The exchange rate is very important for small, open economies such as Sri Lanka. USD/LKR exchange rate has depreciated continuously, ignoring small appreciations experienced from time-to-time. These fluctuations of the exchange rate will lead to an instability and lack of confidence in the economy. Therefore, with the increasing instability of international economies, it is highly important to attain a further understanding of the factors

that affect the variability of the USD/LKR exchange rates.

Though there is ample research on the modelling exchange rate for advanced countries, studies based on emerging countries like Sri Lanka are limited to a few recent studies. Therefore, this study mainly focuses on determining the various economic factors that affect USD/LKR exchange rate and how the movements of these factors together affect the variability of USD/LKR exchange rate. The study also examines the long-term and short-term relationship between USD/LKR exchange rate and the affecting economic factors.

## II. LITERATURE REVIEW

Modelling of exchange rate behaviour is one of the unsolved issues of research to be deal with. Due to the enormous significance of the exchange rate in an economy, there is a need to study exchange rate determinant. Factors affecting exchange rate can be economic, political, psychological and also short run or long run. Behaviour of the exchange rate can be more appropriately studied, through macro and micro variables.

The combination of exchange rate analysis and the factors that determine nominal exchange rates was clearly performed by Philip Lane in 1999. Econometric results show that the most important factor affecting nominal exchange rate is inflation and factors driving long-run inflation. In 2014 Ghalayini agreed with Philip Lane and revealed that inflation is the most important factor that brings volatility in the exchange rate of a country. Ekanayake and Chatrna (2010) found that the level of real exchange rate and its stability has a strong influence on exports and private investment. The results showed that most of the long-run behaviours of the real exchange rate can be explained in term of trade. Uddin et al. (2013) used ARDL approach to co-integration and error correction model to examine the long run and

short run behaviour of the exchange rate in Bangladesh. Empirical results confirm that stock of money results in a real depreciation of the currency, while increasing foreign exchange reserve results in a real appreciation of the currency. In 2003 MacDonald and Ricci estimate that trade openness and capital inflows depreciate the exchange rate while the increase in workers' remittances appreciates exchange rate. To sum up, the empirical evidence of monetary models indicate that the supply and demand of foreign currency determine the exchange rate behaviour of a country.

III. METHODOLOGY

Secondary monthly time series data for the period of January 2009 to June 2015 are used in this study. The effects of inflation (SL\_INF), trade balance (SL\_TRDB), net foreign assets (SL\_NFA) and workers' remittances (SL\_WR), on month end US dollar spot exchange rate (END\_EXR) of Sri Lanka are estimated in this study. Vector Auto Regression (VAR) model is used to model the dynamics and identify the causal relations since all the variables are stationary at first difference and there is no cointegration for the optimum lag order. Granger causality test is performed to identify the directional variations of the variables. Variance decomposition refers to the breakdown of the forecast error variance for a specific time horizon. In this study, the variance decomposition method is used since it can indicate which variables have short-term and long-term impacts on another variable of interest.

IV. RESULTS AND DISCUSSIONS

Since all the variables are stationary at first difference and there is no cointegration for the optimum lag order (lag 1), Vector Auto Regressive Model can be fitted for the variables. The fitted VAR model for the period of 2009 to 2015 is given in equation (1).

$$END\_EXR = C1 * END\_EXR(-1) + C2 * SL\_INF(-1) + C3 * SL\_WR(-1) + C4 * SL\_NFA(-1) + C5 * SL\_TRDB(-1) + C6 \tag{1}$$

The short run dynamics among these variables can be evaluated by examining the significance and sign of the estimated lagged coefficients of the VAR model, which are presented in Table I.

It is observed that the estimated short run coefficient of the variables indicate that net foreign assets and trade balances are statistically significant at 10% level of significance with the current level of USD/LKR exchange rate. Hence, it is evident that previous month net foreign assets, trade balance, and exchange rate have a significant influence on the short run exchange rate.

Summarized results in Table II indicate that there are unidirectional causalities running from net foreign assets, trade balance and workers' remittance to exchange rate, implying that past

TABLE I. VECTOR AUTO REGRESSIVE MODEL

	Coefficient	Std. Error	t-Statistic	Prob.
C1	0.885049	0.0480	18.4439	0.0000
C2	-0.000358	0.0017	-0.2156	0.8300
C3	-0.002497	0.0124	-0.2013	0.8410
C4	0.000000364	0.0000	-2.4677	0.0160
C5	0.000019	0.0000	-1.8697	0.0657
C6	0.561180	0.2048	2.7400	0.0078

TABLE II. RESULTS OF GRANGER CAUSALITY TEST

Null Hypothesis	F Statistic	Probability
SL_WR does not Granger Cause END_EXR	3.96006	0.0503
END_EXR does not Granger Cause SL_WR	2.48401	0.1193
SL_NFA does not Granger Cause END_EXR	7.90135	0.0063
END_EXR does not Granger Cause SL_NFA	0.05292	0.8187
SL_TRDB does not Granger Cause END_EXR	7.32338	0.0084
END_EXR does not Granger Cause SL_TRDB	0.15210	0.6977

values of net foreign assets, trade balance, and workers' remittance have a predictive ability in determining the present values of USD/LKR exchange rate.

TABLE III. VARIANCE DECOMPOSITION OF LN\_END\_EXR

Period	S.E.	SL_INF	SL_WR	SL_NFA	SL_TRDB	END_EXR
1	0.0132	0.1177	0.2629	1.6071	0.0072	98.004
2	0.0180	0.0646	0.1836	4.0226	2.0290	93.700
3	0.0214	0.0877	0.7481	6.8938	4.2073	88.063
4	0.0242	0.1537	2.1108	9.9983	6.0437	81.693
5	0.0266	0.2388	4.2135	13.118	7.5209	74.908
6	0.0289	0.3252	6.8847	16.061	8.6831	68.045
7	0.0312	0.4008	9.9143	18.693	9.5788	61.412
8	0.0334	0.4594	13.106	20.943	10.255	55.234
9	0.0357	0.4990	16.306	22.795	10.756	49.642
10	0.0379	0.5209	19.405	24.270	11.123	44.679
11	0.0402	0.5275	22.338	25.408	11.387	40.337
12	0.0424	0.5221	25.070	26.260	11.576	36.570

Table III provides the results of Variance Decomposition. The evidence based on variance decomposition indicates that in short term forecast time horizon most of the variation in USD/LKR exchange rate is due to the exchange rate itself, while for a long term forecast time the horizon most effects belong to net foreign assets, trade

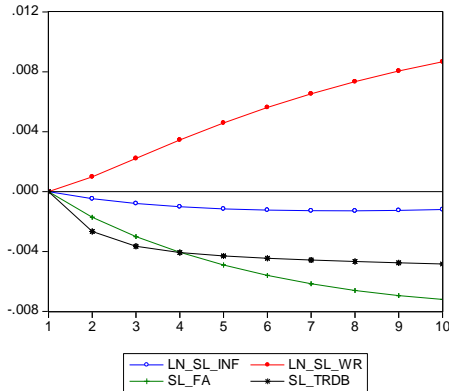


Figure 1. Response of LN\_END\_EXR to Cholesky One S.D. Innovations

balance, and workers' remittance. By proving the results of variance decomposition, the results of impulse and response functions which is presented in Figure 1, show that the shocking of variables net foreign assets and trade balance has a negative impact on the exchange rate for more than one year.

## V. CONCLUSIONS

This paper analyses the factors such as inflation, trade balance, net foreign assets and workers' remittances which affect the volatility of US dollar exchange rate in Sri Lanka, in the period of January 2009 to June 2015.

The empirical results of the model indicate that; the increase in previous month net foreign assets and trade balance, and decrease in previous month exchange rate, has a significant influence on short run appreciation of exchange rate. This means any foreign receipts to Sri Lanka, such as exports, foreign investments inflow and foreign

borrowing, create demand for Sri Lankan Rupees in the foreign exchange market and any payments to foreign countries, such as imports, foreign investments outflow, foreign loan repayments and other payments, create supply of Sri Lankan Rupees. Granger Causality test confirm past

values of net foreign assets, trade balance and workers' remittance have a predictive ability in determining the present values of exchange rate while, Variance Decomposition indicate, variation in exchange rate in short term and long term forecasting time horizon is due to the exchange rate itself and net foreign assets, trade balance and workers' remittance respectively.

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